Nichols Consulting Engineers, Chtd.
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(775) 329-4955

Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Summer Calculations
Watershed	ProposedConditions WS-2

Area (acres)	42.4	Elevation (ft)	6645	Return Period (years)	100

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.27	0.4			12.63
Collector 1	1853	0.33	0.1	28.2	15	3.12
Collector 2	1344	0.05	0.04	33.7	15	2.30
Collector 3	707	0.01	0.025	38.1	1	1.09
					Total Response Time (minutes)	19.15
					Unit Peak Flow (cfs/acre)	1.55
					Infiltration Rate (in/hr)	0.26
					Infiltration Factor (cfs/acre)	0.32
					Percent Impervious	18.2

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**49.02**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

* The last collector area assumes a 50% reduction in the proposed development area due to stormwater runoff that is mitigated by proposed onsite stormwater infiltration devices.

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011					
Engineer	Jack Norberg					
Project	Homewood Mountain Resort - Summer Calculations					
Watershed	Proposed Conditions WS-3					
Area (acres)	10.0	Elevation (ft)	6593	Return Period (years)	100	
	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.18	0.4			14.36
Collector 1	1647	0.30	0.1	8.6	15	3.86
Collector 2	581	0.07	0.11	9.2	1	1.52
Collector 3						
					Total Response Time (minutes)	19.74
					Unit Peak Flow (cfs/acre)	1.50
					Infiltration Rate (in/hr)	0.27
					Infiltration Factor (cfs/acre)	0.33
					Percent Impervious	11.5
Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor						**11.12**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011					
Engineer	Jack Norberg					
Project	Homewood Mountain Resort - Summer Calculations					
Watershed	Proposed Conditions WS-4					
Area (acres)	67.4	Elevation (ft)	6652	Return Period (years)	100	
	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.18	0.4			14.26
Collector 1	2448	0.26	0.1	57.5	15	3.81
Collector 2	1456	0.04	0.02	64.8	3	0.93
Collector 3						
					Total Response Time (minutes)	19.00
					Unit Peak Flow (cfs/acre)	1.58
					Infiltration Rate (in/hr)	0.51
					Infiltration Factor (cfs/acre)	0.62
					Percent Impervious	7.6
Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor						**65.34**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

* The last collector area assumes a 50% reduction in the proposed development area due to stormwater runoff that is mitigated by proposed onsite stormwater infiltration devices.

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011					
Engineer	Jack Norberg					
Project	Homewood Mountain Resort - Summer Calculations					
Watershed	Proposed Conditions WS-5					
Area (acres)	5.4	Elevation (ft)	7408	Return Period (years)	100	
	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.19	0.4			14.04
Collector 1	631	0.22	0.1	4.8	3	1.32
Collector 2						
Collector 3						
					Total Response Time (minutes)	15.36
					Unit Peak Flow (cfs/acre)	1.75
					Infiltration Rate (in/hr)	0.22
					Infiltration Factor (cfs/acre)	0.26
					Percent Impervious	20.4
Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor						**7.47**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

* The last collector area assumes a 50% reduction in the proposed development area due to stormwater runoff that is mitigated by proposed onsite stormwater infiltration devices.

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Summer Calculations
Watershed	Proposed Conditions WS-6

Area (acres)	2.2	Elevation (ft)	7565	Return Period (years)	100

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	180	0.32	0.4			6.52
Collector 1	376	0.30	0.22	2.2	3	1.54
Collector 2						
Collector 3						

Total Response Time (minutes)	8.06
Unit Peak Flow (cfs/acre)	2.50
Infiltration Rate (in/hr)	0.23
Infiltration Factor (cfs/acre)	0.28
Percent Impervious	5.9
Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**5.00**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

* The last collector area assumes a 50% reduction in the proposed development area due to stormwater runoff that is mitigated by proposed onsite stormwater infiltration devices.

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Summer Calculations
Watershed	Proposed Conditions WS-7

Area (acres)	145.7	Elevation (ft)	7465	Return Period (years)	100

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.18	0.4			14.26
Collector 1	4308	0.27	0.1	145.7	15	5.24
Collector 2						
Collector 3						
					Total Response Time (minutes)	19.50
					Unit Peak Flow (cfs/acre)	1.70
					Infiltration Rate (in/hr)	0.28
					Infiltration Factor (cfs/acre)	0.33
					Percent Impervious	1.2

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor **199.91**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

Winter

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Existing Conditions WS-1

Area (acres)	28.3	Elevation (ft)	6702	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	516	0.23	0.4			13.46
Collector 1	1942	0.38	0.1	20.7	15	3.36
Collector 2	369	0.18	0.05	25.3	15	0.48
Collector 3	221	0.02	0.05	28.3	1	0.37
					Total Response Time (minutes)	17.67
					Unit Peak Flow (cfs/acre)	0.91
					Infiltration Rate (in/hr)	0.17
					Infiltration Factor (cfs/acre)	0.21
					Percent Impervious	90

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**25.12**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Existing Conditions WS-2

Area (acres)	42.4	Elevation (ft)	6645	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.27	0.4			12.63
Collector 1	1853	0.33	0.1	28.2	15	3.12
Collector 2	824	0.07	0.1	37.3	3	1.56
Collector 3	305	0.01	0.05	42.4	1	0.56
Collector 4						
					Total Response Time (minutes)	17.88
					Unit Peak Flow (cfs/acre)	0.91
					Infiltration Rate (in/hr)	0.23
					Infiltration Factor (cfs/acre)	0
					Percent Impervious	90

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor **37.38**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Existing Conditions WS-3

Area (acres)	10.0	Elevation (ft)	6593	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.18	0.4			14.36
Collector 1	1715	0.30	0.1	8.6	15	4.05
Collector 2	280	0.12	0.02	10.0	3	0.18
Collector 3						
					Total Response Time (minutes)	18.60
					Unit Peak Flow (cfs/acre)	0.91
					Infiltration Rate (in/hr)	0.34
					Infiltration Factor (cfs/acre)	0.41
					Percent Impervious	90

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**8.72**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Existing Conditions WS-4

Area (acres)	67.4	Elevation (ft)	6652	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.18	0.4			14.26
Collector 1	2448	0.26	0.1	57.5	15	3.81
Collector 2	1456	0.04	0.02	67.4	3	0.92
Collector 3						
					Total Response Time (minutes)	18.99
					Unit Peak Flow (cfs/acre)	0.90
					Infiltration Rate (in/hr)	0.51
					Infiltration Factor (cfs/acre)	0.62
					Percent Impervious	90

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**56.45**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Existing Conditions WS-5

Area (acres)	5.4	Elevation (ft)	7408	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.19	0.4			14.04
Collector 1	616	0.23	0.1	5.4	15	1.81
Collector 2						
Collector 3						
					Total Response Time (minutes)	15.85
					Unit Peak Flow (cfs/acre)	1.10
					Infiltration Rate (in/hr)	0.26
					Infiltration Factor (cfs/acre)	0.31
					Percent Impervious	90

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**5.79**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

90	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Existing Conditions WS-6

Area (acres)	2.2	Elevation (ft)	7565	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	100	0.30	0.4			4.66
Collector 1	401	0.07	0.1	2.2	15	2.32
Collector 2						
Collector 3						
					Total Response Time (minutes)	6.98
					Unit Peak Flow (cfs/acre)	1.50
					Infiltration Rate (in/hr)	0.26
					Infiltration Factor (cfs/acre)	0.31
					Percent Impervious	90

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**3.28**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Existing Conditions WS-7

Area (acres)	145.7	Elevation (ft)	7465	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.18	0.4			14.26
Collector 1	4308	0.27	0.1	145.7	15	5.24
Collector 2						
Collector 3						

Total Response Time (minutes)	19.50
Unit Peak Flow (cfs/acre)	1.00
Infiltration Rate (in/hr)	0.28
Infiltration Factor (cfs/acre)	0.33
Percent Impervious	90
Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**140.82**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Proposed Conditions WS-1

Area (acres)	28.3	Elevation (ft)	6702	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	516	0.23	0.4			13.46
Collector 1	1942	0.38	0.1	20.7	15	3.36
Collector 2	1051	0.06	0.025	24.5	1	0.74
Collector 3						
					Total Response Time (minutes)	17.56
					Unit Peak Flow (cfs/acre)	0.91
					Infiltration Rate (in/hr)	0.15
					Infiltration Factor (cfs/acre)	0.18
					Percent Impervious	90

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**21.87**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

* The last collector area assumes a 50% reduction in the proposed development area due to stormwater runoff that is mitigated by proposed onsite stormwater infiltration devices.

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	ProposedConditions WS-2

Area (acres)	42.4	Elevation (ft)	6645	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.27	0.4			12.63
Collector 1	1853	0.33	0.1	28.2	15	3.12
Collector 2	1344	0.05	0.04	33.7	15	2.30
Collector 3	707	0.01	0.025	38.1	1	1.09
					Total Response Time (minutes)	19.15
					Unit Peak Flow (cfs/acre)	0.89
					Infiltration Rate (in/hr)	0.26
					Infiltration Factor (cfs/acre)	0.32
					Percent Impervious	90
Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor						**32.65**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

* The last collector area assumes a 50% reduction in the proposed development area due to stormwater runoff that is mitigated by proposed onsite stormwater infiltration devices.

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Proposed Conditions WS-3

Area (acres)	10.0	Elevation (ft)	6593	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.18	0.4			14.36
Collector 1	1647	0.30	0.1	8.6	15	3.86
Collector 2	581	0.07	0.11	9.2	1	1.52
Collector 3						
					Total Response Time (minutes)	19.74
					Unit Peak Flow (cfs/acre)	0.89
					Infiltration Rate (in/hr)	0.27
					Infiltration Factor (cfs/acre)	0.33
					Percent Impervious	90
Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor						**7.91**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

* The last collector area assumes a 50% reduction in the proposed development area due to stormwater runoff that is mitigated by proposed onsite stormwater infiltration devices.

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Proposed Conditions WS-4

Area (acres)	67.4	Elevation (ft)	6652	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.18	0.4			14.26
Collector 1	2448	0.26	0.1	57.5	15	3.81
Collector 2	1456	0.04	0.02	64.8	3	0.93
Collector 3						
					Total Response Time (minutes)	19.00
					Unit Peak Flow (cfs/acre)	0.90
					Infiltration Rate (in/hr)	0.51
					Infiltration Factor (cfs/acre)	0.62
					Percent Impervious	90

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**54.34**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

* The last collector area assumes a 50% reduction in the proposed development area due to stormwater runoff that is mitigated by proposed onsite stormwater infiltration devices.

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011					
Engineer	Jack Norberg					
Project	Homewood Mountain Resort - Winter Calculations					
Watershed	Proposed Conditions WS-5					
Area (acres)	5.4	Elevation (ft)	7408	Return Period (years)	10	
	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.19	0.4			14.04
Collector 1	631	0.22	0.1	4.8	3	1.32
Collector 2						
Collector 3						
					Total Response Time (minutes)	15.36
					Unit Peak Flow (cfs/acre)	1.10
					Infiltration Rate (in/hr)	0.22
					Infiltration Factor (cfs/acre)	0.26
					Percent Impervious	90
Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor						**5.20**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

* The last collector area assumes a 50% reduction in the proposed development area due to stormwater runoff that is mitigated by proposed onsite stormwater infiltration devices.

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Proposed Conditions WS-6

Area (acres)	2.2	Elevation (ft)	7565	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	180	0.32	0.4			6.52
Collector 1	376	0.30	0.22	2.2	3	1.54
Collector 2						
Collector 3						

Total Response Time (minutes)	8.06
Unit Peak Flow (cfs/acre)	1.45
Infiltration Rate (in/hr)	0.23
Infiltration Factor (cfs/acre)	0.28
Percent Impervious	90
Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**3.18**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

* The last collector area assumes a 50% reduction in the proposed development area due to stormwater runoff that is mitigated by proposed onsite stormwater infiltration devices.

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Proposed Conditions WS-7

Area (acres)	145.7	Elevation (ft)	7465	Return Period (years)	10

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.18	0.4			14.26
Collector 1	4308	0.27	0.1	145.7	15	5.24
Collector 2						
Collector 3						

Total Response Time (minutes)	19.50
Unit Peak Flow (cfs/acre)	1.00
Infiltration Rate (in/hr)	0.28
Infiltration Factor (cfs/acre)	0.33
Percent Impervious	90
Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**140.86**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Existing Conditions WS-1

Area (acres)	28.3	Elevation (ft)	6702	Return Period (years)	100

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	516	0.23	0.4			13.46
Collector 1	1942	0.38	0.1	20.7	15	3.36
Collector 2	369	0.18	0.05	25.3	15	0.48
Collector 3	221	0.02	0.05	28.3	1	0.37
					Total Response Time (minutes)	17.67
					Unit Peak Flow (cfs/acre)	1.65
					Infiltration Rate (in/hr)	0.17
					Infiltration Factor (cfs/acre)	0.21
					Percent Impervious	90

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**46.03**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Existing Conditions WS-2

Area (acres)	42.4	Elevation (ft)	6645	Return Period (years)	100

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.27	0.4			12.63
Collector 1	1853	0.33	0.1	28.2	15	3.12
Collector 2	824	0.07	0.1	37.3	3	1.56
Collector 3	305	0.01	0.05	42.4	1	0.56
Collector 4						
					Total Response Time (minutes)	17.88
					Unit Peak Flow (cfs/acre)	1.63
					Infiltration Rate (in/hr)	0.23
					Infiltration Factor (cfs/acre)	0
					Percent Impervious	90

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor **67.90**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Existing Conditions WS-3

Area (acres)	10.0	Elevation (ft)	6593	Return Period (years)	100

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.18	0.4			14.36
Collector 1	1715	0.30	0.1	8.6	15	4.05
Collector 2	280	0.12	0.02	10.0	3	0.18
Collector 3						
					Total Response Time (minutes)	18.60
					Unit Peak Flow (cfs/acre)	1.50
					Infiltration Rate (in/hr)	0.34
					Infiltration Factor (cfs/acre)	0.41
					Percent Impervious	90

Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor	**14.65**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).

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Placer County Flood Control and Water Conservation District
Small Watershed Peak Flow Worksheet

Date	7/29/2011
Engineer	Jack Norberg
Project	Homewood Mountain Resort - Winter Calculations
Watershed	Existing Conditions WS-4

Area (acres)	67.4	Elevation (ft)	6652	Return Period (years)	100

	Length (ft)	Slope (ft/ft)	Manning's n value	Contributing Area (acres)	Side Slope (ft/ft)	Response Time (minutes)
Overland Flow	500	0.18	0.4			14.26
Collector 1	2448	0.26	0.1	57.5	15	3.81
Collector 2	1456	0.04	0.02	67.4	3	0.92
Collector 3						
					Total Response Time (minutes)	18.99
					Unit Peak Flow (cfs/acre)	1.55
					Infiltration Rate (in/hr)	0.51
					Infiltration Factor (cfs/acre)	0.62
					Percent Impervious	90
Watershed Peak Flow (cfs): Area x Unit Peak Flow-(1-Percent Impervious) x Area x Infiltration Factor						**100.25**

1. Manning's n Values taken from Placer County, Storm Water Management Manual (SWMM), Table 5-5. Woods with some Underbrush - Low = 0.4

2. Percent Impervious taken from Placer County, Storm Water Management Manual (SWMM), Table 5-4 "Snow Covered Areas" Elevation 6,500 feet East = 90%

3. Infiltration Rates taken from Placer County, Storm Water Management Manual (SWMM), Table 5-3, for Hydrologic Soil Groups with Good Woodland- Coniferous Cover (A = 0.53, B = 0.26, C = 0.15, D = 0.11) and Streets and Roads (A = 0.07, B = 0.06).